

# PATENT ABSTRACTS OF JAPAN

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(54) METHOD FOR SEPARATING RESIN FROM LAMINATE OF METALLIC MATERIAL AND RESIN

(57)Abstract:

**PROBLEM TO BE SOLVED:** To remove a resin from vibration-damping sections whose mounting is defective and thereby reuse extruded aluminum sections by heating a laminate of a metallic material and a resin mounted on the surface of the metallic material and melting the resin to peel it off the surface of the metallic material.

**SOLUTION:** When heating a laminate, the laminate is held so that the face on which a metallic material 1 is mounted comes to the top in a heating furnace and a molten resin 2 peels off and drops downward. In this case, a receiving member 3 is placed below so that the resin 2 lands on the member 3. The receiving member 3 is, for example, an aluminum foil which can be easily molded and introduced into the hollow part of long-size sections as a convenient material. The resin 2, heated in the heating furnace, peels off and drops onto the receiving member 3, so that the receiving member 3 has only to be drawn out after cooling. This method is applicable to especially, vibration-deadening sections consisting of the resin 2 mounted on the inner surface of the hollow part of long-size hollow sections.



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CLAIMS

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[Claim(s)]

[Claim 1]A separation method of resin heating a layered product which consists of resin stuck on a metallic material and its surface, fusing this resin, and exfoliating from the metallic material surface.

[Claim 2]A separation method of resin indicated to Claim 1 to which an attachment side of resin is characterized by an inclination or holding the above-mentioned layered product so that it may become vertical into a heating furnace.

[Claim 3]A separation method of resin indicated to Claim 1 arranging a receptacle member of resin which held the above-mentioned layered product so that an attachment side of resin might come in a heating furnace in a ceiling surface, and exfoliated down this attachment side.

[Claim 4]A separation method of resin indicated to either of the Claims 1-3, wherein a metallic material is an extruded section which has a centrum and resin is stuck on the centrum inner surface.

[Claim 5]A separation method of resin indicated to either of the Claims 1-4, wherein resin carries out thermal melting arrival of the above-mentioned layered product to a metallic material.

[Claim 6]A separation method of resin indicated to either of the Claims 1-5, wherein the above-mentioned resin is resin of an asphalt system.

[Claim 7]A separation method of resin indicated to Claim 6, wherein cooking temperature is 190 \*\* - 490 \*\*.

[Claim 8]A separation method of resin indicated to either of the Claims 1-7, wherein a metallic material is a heat treatable aluminum alloy and cooking temperature is 250 \*\* or less.

[Claim 9]A separation method of resin heating a layered product which consists of resin stuck on a metallic material and its surface via adhesives, fusing these adhesives, and exfoliating from the metallic material surface.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to a metallic material and the method of separating resin from the layered product which resin laminated.

[0002]

[Description of the Prior Art]In JP,H7-164584,A concerning application of these people, the damping profile which carried out thermal melting arrival of the damping plastics fabricated by the sheet shaped to the face plate of an aluminum extruded section or the surface of the rib is indicated. The damping plastics fabricated to the sheet shaped is suitably laid in the field which can appear by prudence by a means, damping plastics, such as a face plate, a rib, etc. of an aluminum extruded section, puts the whole into a heating furnace, and heats it, and this damping profile is obtained by carrying out thermal melting arrival of the damping plastics to the field of an aluminum extruded section as indicated in the above-mentioned gazette. When an aluminum extruded section consists of a heat-treated type aluminum containing alloy, it can also carry out to serve also as this thermal melting arrival with aging treatment.

[0003]In order to acquire a high damping effect, needless to say, damping plastics needs to stick to the position of the aluminum extruded section, but, falling during heating within the time of insertion to a heating furnace, or a furnace, when damping plastics causes a position gap or lays in a tight inclined plane \*\*\* — etc. — poor attachment may arise. The damping plastics which once carried out thermal melting arrival is firmly joined to the aluminum profile surface, An aluminum extruded section contains a centrum especially by a long picture (in a long thing, it amounts to 25 m), In order to obtain the damping profile which there is no means to exfoliate rationally and targets an aluminum extruded section to resin if such poor attachment is caused when damping plastics is carrying out thermal melting arrival to the centrum inner surface, the method only had redoing newly using another aluminum extruded section.

[0004]

[Problem(s) to be Solved by the Invention]This invention removes resin from the damping profile which caused the poor attachment neglected until now, and an object of this invention is to enable it to reuse an aluminum extruded section. Speaking more generally, removing resin from the layered product which consists of resin stuck on a metallic material and its surface, and aiming at enabling it to reuse a metallic material.

[0005]

[Means for Solving the Problem]This invention heats a layered product which consists of resin stuck on a metallic material and its surface, and is concerned with a separation method of resin fusing this resin and exfoliating from the metallic material surface. Here, although a board and a profile are typically contained in a metallic material, it is not necessarily limited to these specific shape. The surface of a metallic material also means an inner surface of this centrum, when a metallic material has a centrum.

[0006]The above-mentioned invention is generally applicable to a layered product by which resin fused with heating sticks to a metallic material and its surface, For example, a thing in which resin carried out thermal melting arrival to the metallic material surface which was indicated to

said JP,H7-164584,A, It can apply to that in which resin carried out thermal melting arrival via a plastic film of a hot melt type, a thing by which resin was stuck on the metallic material surface via adhesives (without carrying out thermal melting arrival), etc. equally, and a layer of resin can also be applied not only to much more thing but to a multilayer thing. Resin, hot melt, or adhesives lose adhesive strength by heating beyond temperature which resin fuses in any case, and resin exfoliates easily.

[0007]

[Embodiment of the Invention]When heating a layered product, in a heating furnace, an inclination or the resin fused when holding this layered product so that it might become vertical exfoliates, and the attachment side of resin sticks with prudence, and slides down a field top. These resin is received in an existing heat-resistant receptacle member like the griddle and aluminum foil which were placed caudad.

[0008]A layered product is held, the fused resin 2 exfoliates, and it may be made to fall caudad so that the attachment side of the metallic material 1 may turn into a ceiling surface as shown in drawing 1. It is preferred to win popularity caudad also in this case, to place the member 3, and to make it drop resin on this. As it is suitably applied to the damping profile by which resin was stuck on this centrum inner surface of a long hollow profile, for example, is shown in drawing 2, the side which it is made for the false face of the hollow profile 11 to turn into a ceiling surface, and inserts the receptacle member 13 in a centrum and serves as a floor line is covered especially with this method. The aluminum foil which is easy to fabricate and is easy to insert as this receptacle member 13 in the centrum of a long profile is useful. What is necessary is just to take out this receptacle member 13 after cooling, since the resin 12 will exfoliate, popularity will be won and it will fall on the member 13, if this is put into a heating furnace and heated.

[0009]Resin of an asphalt system can be mentioned as an example of the resin in which this invention is applied. For example, the heating weld nature damping plastics for structural members indicated to JP,H8-209002,A is an example of asphalt system resin, and this, It consists of 15 to 35 % of the weight of asphalt, 2 to 10 % of the weight of synthetic rubbers, 1 to 5 % of the weight of petroleum resin, and 50 to 75 % of the weight of fillers, and a filler consists of 10 to 25 % of the weight of inorganic lightweight aggregates, 35 to 50 % of the weight of powdered fillers, 3 to 8 % of the weight of fibrous fillers, and 2 to 5 % of the weight of quicklime. This invention can be applied even when asphalt system resin is foaming including foam.

[0010]Although thermal melting arrival of the asphalt system resin is generally carried out at the temperature of 140 \*\* – 190 \*\*, when exfoliating from a metallic material, it is necessary to heat this in temperature of 190 \*\* – 490 \*\* beyond it. That is, at less than 190 \*\*, it is [ even if ] difficult in an attachment side an inclination or to let resin slide or to drop it, even if it has stood vertically. However, if it becomes the temperature over 490 \*\*, resin will burn out, smoke and an offensive odor occur, and trouble occurs in work. 2 t of Edie Kel M-3000S (trade name) which is asphalt system damping plastics with typical Table 1, Once carrying out thermal melting arrival of four kinds of damping plastics (3t, 5t, and 9t) to a 9-t aluminum board on condition of 175 \*\*x7hr, it is the example which 180 \*\* – 10 \*\* of attachment sides were minced in the state where it leaned to 45 degrees, it came out, heating maintenance was carried out for 1 hour, respectively, and the sound deadener slid down, and measured temperature (the maximum slide width is set as 20 mm). As shown in this table, it is beginning to slide at 190 \*\*.

[0011]

[Table 1]

制振樹脂厚さ	加熱温度 (保持時間 1 時間)					
	180℃	190℃	200℃	210℃	220℃	250℃
2mm <sup>t</sup>	0 mm	0 mm	5 mm	5 mm	5 mm	5 mm
3mm <sup>t</sup>	0 mm	0 mm	10 mm	10 mm	10 mm	10 mm
5mm <sup>t</sup>	0 mm	0 mm	10 mm	10 mm	10 mm	10 mm
9mm <sup>t</sup>	0 mm	5 mm	20 mm	20 mm	20 mm	20 mm

[0012]The metallic material from which resin was separated by this invention can stick resin

again, and can reuse it as a layered product. In order to start strength reduction if it heats to a high temperature above to some extent when a metallic material is a heat treatable aluminum alloy, resin is stuck after performing a re-temper (it may serve as the heating and heating of aging treatment in the case of thermal melting arrival), when such. Although some temperature for which a re-temper is needed according to the kind of heat treatable aluminum alloy differs, if it is heating at 250 \*\* or less, intensity will not fall greatly with short-time heating, and there will be no necessity for a re-temper. Therefore, when resin is asphalt system resin, it is preferred to choose temperature suitably of within the limits of 190–250 \*\*. However, if strength reduction may be carried out [ not being concerned with whether it is a heat-treated type ], it cannot be overemphasized by heating at elevated temperatures, such as 300 \*\* and 400 \*\*, that it can dissociate more effectively. Although the example shown in drawing 3 is intensity change at the time of carrying out short-time heating of the 6N01–T5 material used as a structural member for vehicles (damping profile), if it exceeds 250 \*\*, tensile strength and proof stress will decline rapidly.

[0013]It explained until now on the assumption that melting of resin itself was carried out, but when resin is stuck on the metallic material surface via adhesives (without carrying out thermal melting arrival), even if it does not heat to the temperature which resin itself fuses, resin can be exfoliated by fusing adhesives. In this case, resin does not need to be resin fused with heating. Needless to say, the holding method in the heating furnace explained until now, cooking temperature in case a metallic material is a heat treatable aluminum alloy, etc. are applicable as it is.

[0014]If vibration is given to a metallic material during heating when heating according to this invention, resin can be separated more effectively. If it sets up so that a hot wind may hit a metallic material directly all over a heating furnace, probably because a metallic material will vibrate in response to a hot wind, separation of resin is performed effectively.

[0015]

[Example]Thermal melting arrival of the 5-mm-thick asphalt system damping plastics (trade name Edie Kel M-3000S) was carried out to the crevice of the face plate of pi die pressing appearance profile (25 m in length) which consists of one face plate as shown in drawing 1, and two or more ribs on condition of 175 \*\*x7hr. Next, this was stood at right angles to a vertical mold hardening furnace, and was placed, and 250 \*\*x30min maintenance was carried out in this state. From the attachment side, damping plastics exfoliated, was slid down, and was deposited on the receptacle member installed caudad.

[0016]Thermal melting arrival of the asphalt system damping plastics (trade name Edie Kel M-3000S) was carried out to the centrum inner surface (inside of one face plate) of the hollow extruded section (25 m in length) which consists of the face plate of a couple and two ribs as shown in drawing 2 on condition of 175 \*\*x7hr. Next, it is made for an attachment side to turn into a ceiling surface, it covered the side used as a floor line with aluminum foil, placed this horizontally in a horizontal-type temper furnace, and carried out 250 \*\*x30min maintenance in this state. When damping plastics exfoliated from the attachment side, and fell on aluminum foil and the aluminum foil after profile cooling was taken out of the centrum, it was able to take out damping plastics together.

[0017]

[Effect of the Invention]According to this invention, resin can be simply removed from the layered product which consists of resin stuck on a metallic material and its surface, and the metallic material can be reused now. The profile with poor attachment which had to be neglected until now can be reused now like the damping profile which stuck damping plastics on this centrum inner surface of the profile of the long picture which has a centrum especially.

[Translation done.]

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1]It is a figure explaining how to exfoliate the damping plastics stuck on the metallic material (pi die pressing appearance profile).

[Drawing 2]It is a figure explaining how to exfoliate the damping plastics similarly stuck on the metallic material (hollow extruded section).

[Drawing 3]It is a figure showing intensity change when an aluminum containing alloy is heated.

[Description of Notations]

1 and 11 Metallic material

2 and 12 Resin

3, 13 receptacle member

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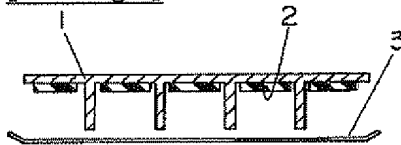
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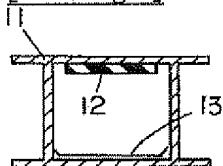
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## DRAWINGS

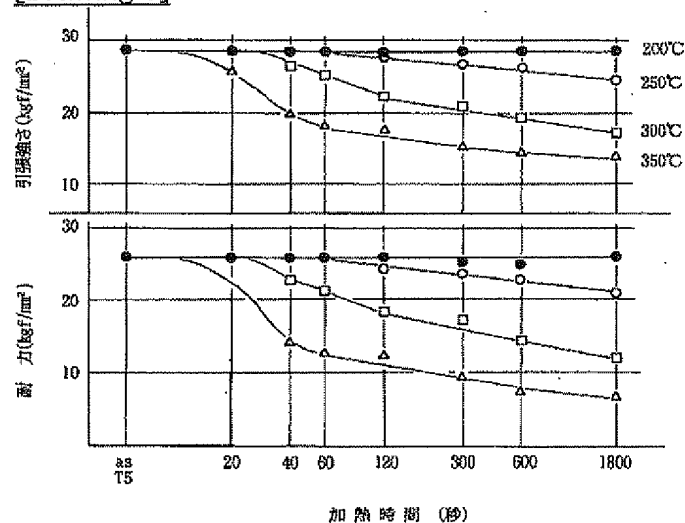
[Drawing 1]



[Drawing 2]



[Drawing 3]



[Translation done.]

JP 10-180763 A

This document discloses a method of separating resin from a laminated body of metal and resin, in which the separation is performed by heating the laminated body and melting the resin (for example, Claim 1). The document teaches that the separation of resin can be performed effectively by providing vibration during heating (Paragraph [0014]).



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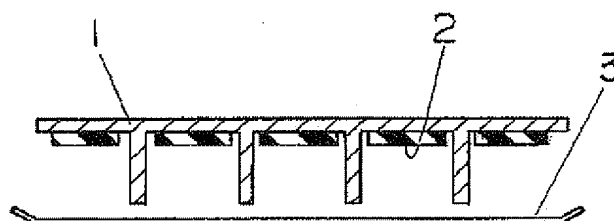
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(54) 【発明の名称】 金属材と樹脂の積層体から樹脂を分離する方法

(57) 【要約】

【課題】 貼り付け不良を起こした制振形材から樹脂を取り除き、アルミ押出形材を再利用できるようにする。

【解決手段】 アルミ押出形材1の凹部に樹脂2が貼り付けられた制振形材を、貼り付け面が天井面になるように加熱炉中に置き、加熱する。樹脂は溶融して貼り付け面から剥離し、下方に置いたアルミ箔等からなる受け部材3上に落下する。



## 【特許請求の範囲】

【請求項1】 金属材とその表面に貼り付けられた樹脂からなる積層体を加熱し、該樹脂を溶融して金属材表面から剥離することを特徴とする樹脂の分離方法。

【請求項2】 加熱炉内において樹脂の貼り付け面が傾斜又は垂直になるように上記積層体を保持することを特徴とする請求項1に記載された樹脂の分離方法。

【請求項3】 加熱炉内において樹脂の貼り付け面が天井面になるように上記積層体を保持し、該貼り付け面の下方に剥離した樹脂の受け部材を配置することを特徴とする請求項1に記載された樹脂の分離方法。

【請求項4】 金属材が中空部を有する押出型材であり、その中空部内面に樹脂が貼り付けられていることを特徴とする請求項1～3のいずれかに記載された樹脂の分離方法。

【請求項5】 上記積層体は、金属材に樹脂が熱融着したものであることを特徴とする請求項1～4のいずれかに記載された樹脂の分離方法。

【請求項6】 上記樹脂がアスファルト系の樹脂であることを特徴とする請求項1～5のいずれかに記載された樹脂の分離方法。

【請求項7】 加熱温度が190℃～490℃であることを特徴とする請求項6に記載された樹脂の分離方法。

【請求項8】 金属材が熱処理型アルミニウム合金であり、加熱温度が250℃以下であることを特徴とする請求項1～7のいずれかに記載された樹脂の分離方法。

【請求項9】 金属材とその表面に接着剤を介して貼り付けられた樹脂からなる積層体を加熱し、該接着剤を溶融して金属材表面から剥離することを特徴とする樹脂の分離方法。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】 本発明は、金属材と樹脂が積層した積層体から樹脂を分離する方法に関する。

## 【0002】

【従来の技術】 本出願人の出願に係る特開平7-164584号公報には、シート状に成形された制振樹脂をアルミ押出型材の面板又はリップの表面に熱融着した制振型材が記載されている。この制振型材は、上記公報に記載されているように、アルミ押出型材の面板やリップ等、制振樹脂が自重で載り得る面にシート状に成形した制振樹脂を適宜手段で載置し、全体を加熱炉に入れて加熱し、制振樹脂をアルミ押出型材の面に熱融着することによって得られる。アルミ押出型材が熱処理型アルミ合金からなる場合は、この熱融着を時効処理と兼ねて行うこともできる。

【0003】 高い制振効果を得るためには、いうまでもなく制振樹脂がアルミ押出型材の所定の位置に貼り付いている必要があるが、加熱炉への挿入時や炉内での加熱中に、制振樹脂が位置ずれを起こしたり、きつい傾斜面

に載置したような場合は倒れたり等、貼り付け不良が生ずることがある。いったん熱融着した制振樹脂はアルミ型材表面に強固に接合しており、特に、アルミ押出型材が長尺（長いものでは25mに達する）で中空部を含み、その中空部内面に制振樹脂が熱融着しているような場合、このような貼り付け不良を起こすとアルミ押出型材から樹脂を合理的に剥離する手段がなく、目的とする制振型材を得るためには、別のアルミ押出型材を用いて新しくやり直すしか方法がなかった。

## 【0004】

【発明が解決しようとする課題】 本発明は、これまで放置されていた貼り付け不良を起こした制振型材から樹脂を取り除き、アルミ押出型材を再利用できるようにすることを目的とする。また、より一般的にいえば、金属材とその表面に貼り付けられた樹脂からなる積層体から樹脂を取り除き、金属材を再利用できるようにすることを目的とする。

## 【0005】

【課題を解決するための手段】 本発明は、金属材とその表面に貼り付けられた樹脂からなる積層体を加熱し、該樹脂を溶融して金属材表面から剥離することを特徴とする樹脂の分離方法に関わる。ここで、金属材には典型的には板、型材が含まれるが、これら特定の形状に限定されるわけではない。また、金属材の表面とは、金属材が中空部を有するような場合は該中空部の内面をも意味する。

【0006】 上記発明は、金属材とその表面に加熱により溶融する樹脂が貼り付いてなる積層体に一般的に適用することができ、例えば、前記特開平7-164584号公報に記載されたような、金属材表面に樹脂が熱融着したものの、樹脂がホットメルトタイプのプラスチックフィルムを介して熱融着したもの、樹脂が接着剤を介して（熱融着することなく）金属材表面に貼り付けられたもの等に、等しく適用することができ、樹脂の層も一層のものだけでなく多層のものにも適用できる。いずれの場合も、樹脂が溶融する温度以上に加熱することで樹脂、ホットメルト又は接着剤が接着力を失い、樹脂は容易に剥離する。

## 【0007】

【発明の実施の形態】 積層体を加熱する際、加熱炉内において樹脂の貼り付け面が傾斜又は垂直になるように該積層体を保持しておけば、溶融した樹脂が剥離し自重により貼り付け面上を滑り落ちる。これらの樹脂は下方に置いた鉄板やアルミ箔のような耐熱性のある受け部材に受け入れられる。

【0008】 また、図1に示すように、金属材1の貼り付け面が天井面になるように積層体を保持し、溶融した樹脂2が剥離して下方に落下するようにしてもよい。この場合も、下方に受け部材3を置き、この上に樹脂を落下させるようにするのが好ましい。この方法は、特に長

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尺の中空型材の該中空部内面に樹脂が張り付けられた制振型材へ好適に適用され、例えば図2に示すように、中空型材11の張り付け面が天井面になるようにし、受け部材13を中空部に挿入して床面となる側に敷く。この受け部材13としては、成形しやすく、かつ長尺型材の中空部に挿入しやすいアルミ箔が便利である。これを加熱炉に入れて加熱すると、樹脂12は剥離して受け部材13上に落下するので、冷却後この受け部材13を引っ張り出せばよい。

【0009】本発明が適用される樹脂の一例としてアスファルト系の樹脂を挙げることができる。例えば特開平8-209002号公報に記載された構造部材用加熱融着性制振樹脂がアスファルト系樹脂の例であり、これは、アスファルト15～35重量%、合成ゴム2～10重量%、石油樹脂1～5重量%、充填材50～75重量%からなり、充填材は無機軽量骨材10～25重量%、粉状充填材35～50重量%、繊維状充填材3～8重量%、生石灰2～5重量%からなる。アスファルト系樹脂が発泡材を含み発泡している場合でも本発明は適用でき\*

制振樹脂厚さ	加熱温度（保持時間1時間）					
	180℃	190℃	200℃	210℃	220℃	250℃
2mm <sup>t</sup>	0 mm	0 mm	5 mm	5 mm	5 mm	5 mm
3mm <sup>t</sup>	0 mm	0 mm	10 mm	10 mm	10 mm	10 mm
5mm <sup>t</sup>	0 mm	0 mm	10 mm	10 mm	10 mm	10 mm
9mm <sup>t</sup>	0 mm	5 mm	20 mm	20 mm	20 mm	20 mm

【0012】本発明により樹脂が分離された金属材は、再度樹脂を貼り付け積層体として再利用することができる。金属材が熱処理型アルミニウム合金の場合、ある程度以上高い温度に加熱すると強度低下を起こすため、そのようなときは再調質を行った後（熱融着の場合はその加熱と時効処理の加熱を兼ねてよい）、樹脂を貼り付ける。熱処理型アルミニウム合金の種類によって再調質が必要となる温度は多少異なるが、250℃以下の加熱であれば短時間の加熱で強度が大きく低下することはない。従って、樹脂がアスファルト系樹脂の場合、190～250℃の範囲内の適宜温度を選択するのが好ましい。ただし、熱処理型であるか否かに関わらず強度低下してもよいのであれば、300℃、400℃といった高温で加熱することにより、より効果的に分離できることはいうまでもない。なお、図3に示す例は、車両用の構造部材（制振型材）として使用される6N01-T5材を短時間加熱した場合の強度変化であるが、250℃を超えると引張強度及び耐力が急激に低下している。

【0013】なお、これまでは、樹脂自体を溶融させることを前提に説明したが、樹脂が接着剤を介して（熱融着することなく）金属材表面に貼り付けられた場合、樹脂自体が溶融する温度まで加熱しなくても、接着剤を溶融することで樹脂を剥離することができる。この場合、

＊る。

【0010】アスファルト系樹脂は一般に140℃～190℃の温度で熱融着されるが、これを金属材から剥離するには、それ以上の温度190℃～490℃に加熱する必要がある。つまり、190℃未満ではたとえ貼り付け面を傾斜又は垂直に立てていても樹脂を滑らせ又は落下させることは難しい。しかし、490℃を超える温度となると樹脂が燃えてしまい、煙、悪臭が発生し作業に支障が出る。なお、表1は、代表的なアスファルト系制振樹脂であるイーディケルM-3000S（商品名）の2t、3t、5t、9tの4種類の制振樹脂を、9tのアルミ板に175℃×7hrの条件で一度熱融着した後、貼り付け面を45°に傾けた状態で180℃～10℃刻みでそれぞれ1時間加熱保持し、制振材の滑り落ち温度を測定した例である（最大滑り幅は20mmに設定）。この表に示すように、190℃で滑り始めている。

【0011】

【表1】

樹脂は加熱により溶融する樹脂である必要はない。いうまでもなく、これまで説明した加熱炉内での保持方法や、金属材が熱処理型アルミニウム合金である場合の加熱温度等はそのまま適用できる。

【0014】本発明にしたがって加熱する際、加熱中に金属材に振動を与えると、より効果的に樹脂を分離することができる。なお、加熱炉中において熱風が直接金属材に当たるように設定しておく、熱風を受けて金属材が振動するためか、樹脂の分離が効果的に行われる。

【0015】

【実施例】図1に示すような1つの面板と複数のリブからなるπ型押出型材（長さ25m）の面板の凹部に、厚さ5mmのアスファルト系制振樹脂（商品名イーディケルM-3000S）を175℃×7hrの条件で熱融着した。次に、これを縦型焼入れ炉に垂直に立てて置き、この状態で250℃×30min保持した。制振樹脂は貼り付け面から剥離して滑り落ち、下方に設置した受け部材上に堆積した。

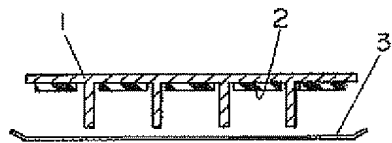
【0016】また、図2に示すような一対の面板と2つのリブからなる中空押出型材（長さ25m）の中空部内面（一方の面板の内側）にアスファルト系制振樹脂（商品名イーディケルM-3000S）を175℃×7hrの条件で熱融着した。次に、貼り付け面が天井面になるようにし、アルミ箔を床面となる側に敷いて、これを横

型テンパー炉の中に水平に置き、この状態で250℃×30min保持した。制振樹脂は貼り付け面から剥離してアルミ箔上に落下し、型材冷却後アルミ箔を中空部から引っ張り出すと、制振樹脂を一緒に取り出すことができた。

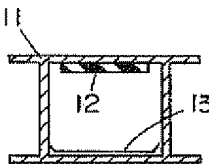
#### 【0017】

【発明の効果】本発明によれば、金属材とその表面に貼り付けられた樹脂からなる積層体から樹脂を簡単に取り除き、その金属材を再利用することができるようになる。特に、中空部を有する長尺の型材の該中空部内面に 10 制振樹脂を貼り付けた制振型材のように、これまで放置するしかなかった貼り付け不良の型材を再利用できるよ\*

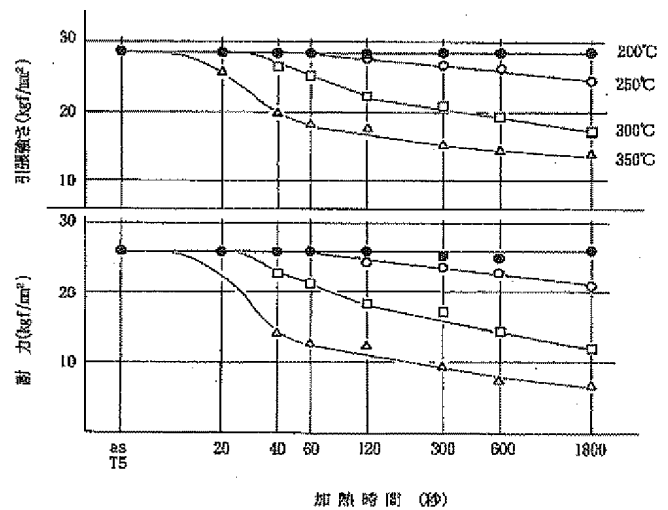
【図1】



【図2】



【図3】



フロントページの続き

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